



# How eLRODS Protect Payloads

POIWG Face-to-Face #39

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January 26, 2016

# eLRODS Requirements

## **Purpose**

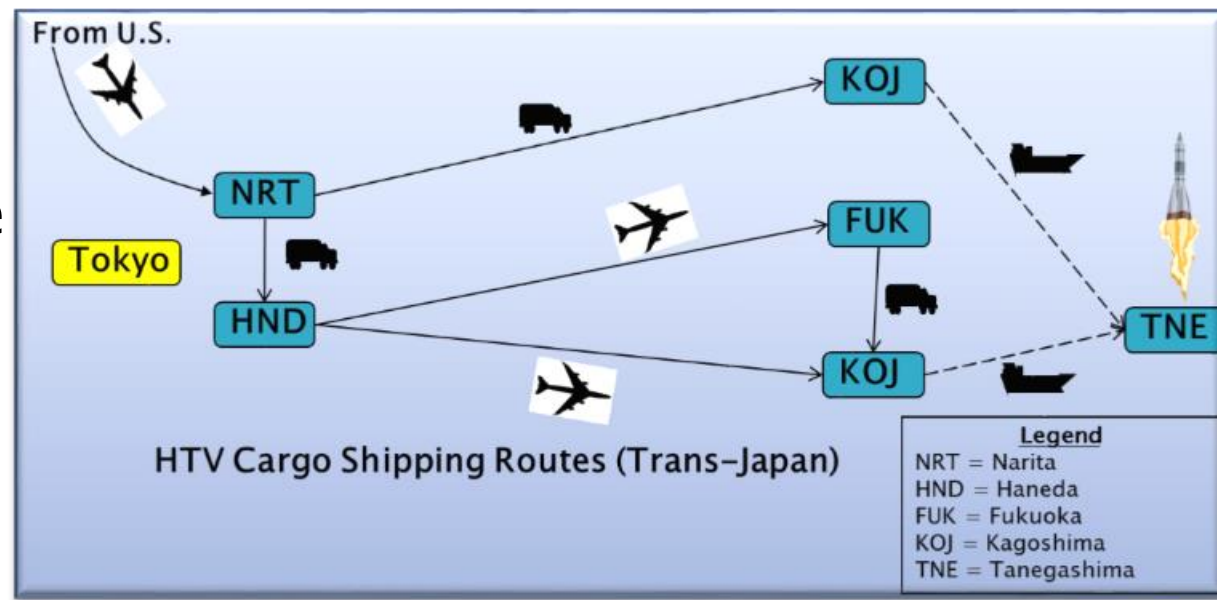
To communicate how eLRODS are used at CMC to protect hardware during receipt, ground handling and delivery of your Science/Cargo to the International Space Station (ISS)

# What is an eLRODS

- ▶ Launch, Return and On-Orbit Data Set (eLRODS)
  - ▶ Contains hardware requirements and information which drive cargo processing, packaging, cargo handling, shipping and export control products
  - ▶ Submitted by the hardware sustainer for each manifested flight item
  - ▶ Requirements are imported into the Mission Integration Database Application System (MIDAS), Return Manifest Disposition Plan (RMDP) and tracked in the Hardware Accountability Matrix Report (MAMR)

# eLRODS Reduce Risk

- ▶ Incomplete information in a eLRODS can result in Program and hardware risks including:
  - ▶ Damage to hardware
    - ▶ Environmental violations during ground handling
    - ▶ Incorrect packing for shipment or launch
    - ▶ Loss of Science
  - ▶ Increased shipment costs
  - ▶ Negative Work
  - ▶ Shipment delays
  - ▶ Damage to vehicle



# When are eLRODS Required?

- ▶ eLRODS for Launch are nominally required at Hardware Audit (On dock-6 weeks)
- ▶ eLRODS for Return are nominally required at Landing -15 weeks

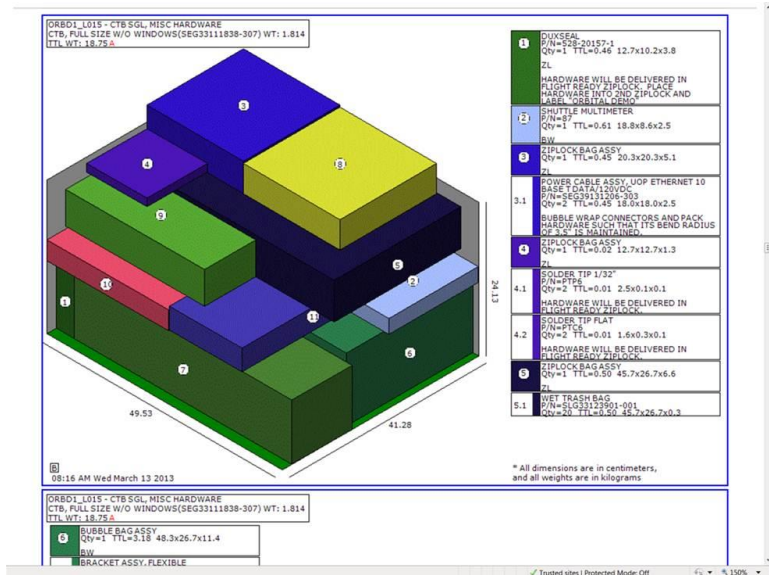
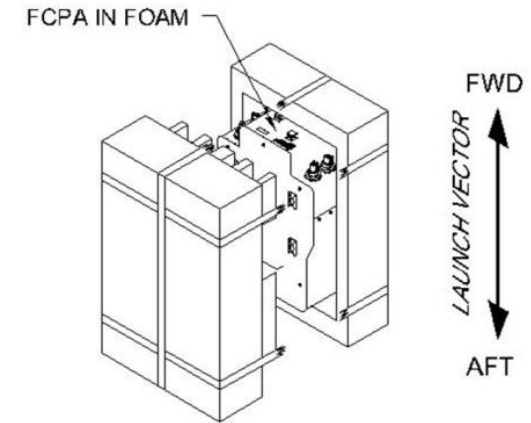
# eLRODS Used Across CMC

eLRODS  
Support the  
following  
Organizations  
and events at  
CMC



# Cargo Bag Packing Plan

- ▶ Bag layouts are created by identifying specific eLRODS requirements, such as:
  - ▶ ESD Sensitivity and Protection
  - ▶ Orientation
    - ▶ Launch Vector
  - ▶ Packaging
  - ▶ Bend Radius (hoses, cables, etc.)
  - ▶ Keep Out Zones
  - ▶ Special Foam Requirements
  - ▶ Pressure Vessel
  - ▶ Special Labeling



# Hardware Receiving Process

- ▶ When Hardware Arrives On-Dock, eLRODS communicate key handling information, such as:
  - ▶ Procedures for removal and installation of Shipping Container/Fixtures
  - ▶ Initial identification of Hazardous Materials
  - ▶ Keep out zones
  - ▶ Environmental Sensitivities
    - ▶ ESD
    - ▶ Temperature
    - ▶ Humidity
    - ▶ Shock
    - ▶ Weight



# Hardware Verifications

- ▶ eLRODS are used during the Hardware Verification Review (HVR) to verify the flight readiness of hardware received
  - ▶ Flight ready packaging
  - ▶ Labeling per ISS Program guidelines (SSP57000)
  - ▶ Ground orientation
  - ▶ ESD Sensitivity and Protection
  - ▶ Cleanliness Levels
  - ▶ Radiation
  - ▶ Bend Radius
  - ▶ Keep Out Zones

# Packaging Requirements

- ▶ Hardware is packaged and packed per eLRODS requirements
  - ▶ Cleanliness levels
  - ▶ Bubble-wrap or Ziploc
  - ▶ Special Foam / Foam requirements
  - ▶ Orientation identification
  - ▶ Labeling

# Safety Assessments

- ▶ **Data from the eLRODS is also used in the Integrated Bag Level Hazard Assessment (IBLHA)**
  - ▶ The IBLHA identifies and communicates new hazards created by cargo packed together for each bag
  - ▶ System Safety Reviews:
    - ▶ Hazards (batteries, chemicals, leak rates, radioactive, pressure vessels, etc.) identified from eLRODS for manifested hardware (Begins at Hardware Audit–1 week)
    - ▶ Materials Safety Data Sheets (MSDS)/Safety Data Sheet (SDS) and Hazardous Materials Summary Table (HMST) for hardware in each bag
    - ▶ Coordinates approval with Safety Review Panel (SRP)

# Environmental Requirements for Transportation

- ▶ **Temperature**
  - ▶ Temperature controlled shipments
  - ▶ Temperature monitoring devices
- ▶ **Humidity**
  - ▶ Desiccant
  - ▶ Nitrogen Purge
- ▶ **Shock Sensitivities**
  - ▶ Air-ride shipment
  - ▶ Shipping containers
  - ▶ Shock Indictors
    - ▶ Used internal and external
- ▶ **Condensation**
  - ▶ Temperature and Humidity tracking
  - ▶ Nitrogen Purge
  - ▶ Desiccant



# Logistics / Shipping

- ▶ eLRODS are used to determine the Transportation Requirements
  - ▶ Haz/Mat assessments
    - ▶ MSDSs/SDSs and HMST (if substance/quantity varies by flight) required to properly meet DoT regulations
  - ▶ Domestic Transportation Guidelines
    - ▶ 49CFR – Hazardous Materials Regulations
      - ▶ May drive packing (specification/rated packing), declarations or exemptions, special permits
      - ▶ May impact layouts (segregation, quantity limits)
        - ▶ Data needed to support PRR
  - ▶ International Transportation Guidelines
    - ▶ International Air Transportation Association (IATA)
    - ▶ Hazardous/Dangerous Goods Regulations
    - ▶ Customs declarations of goods



Modes of Transportation  
Truck, Passenger Air, Cargo Air,  
Handy Carry, Diplomatic Shipment

# eLRODS Phase 2

- ▶ eLRODS Phase 2 is in work to improve the tool and expand its capabilities in 2016
  - ▶ Decrease amount of duplicate data entry provided by hardware providers
  - ▶ Expedite creation, review and submittal process
    - ▶ More user friendly change tracking for updates/rejections
    - ▶ Numbering of all fields and additional comment/informational fields
    - ▶ Allow hardware providers to start an eLRODS before its in the part catalog using a temporary number
    - ▶ Significantly enhance the cargo return section
    - ▶ Provide a pull down list of available packaging materials
    - ▶ Add a "Cold Stowage" or "Powered Payload" toggle for launch/return handling requirements to minimize questions required
    - ▶ Create an option that allows submittal of a new record for a duplicate P/N different S/Ns (ex. Nanoracks Module-9)
    - ▶ Allow user to change POC (Primary or Secondary)
    - ▶ New desired reports to be created
    - ▶ Clarify expectations of data being requested by updating information buttons



# Contact Information

**eLRODS**

Unread Notifications Search

**POC** CMC Point of Contact

**Cargo Integration**

Kristie Brandon  
281-280-4130  
kristie.l.brandon@lmco.com

- ESD
- Launch Tox (Does hardware have a different Tox code for Launch than for On-orbit operation?)
- Launch Packing/Assembly (all questions)
- Launch Ground Handling (all questions)
- Return Packing/Assembly (all questions)
- Return Ground Handling (all questions)

**Logistics**

Greg Eick  
281-280-4072  
gregory.f.eick@lmco.com

- Launch Tox (Does the hardware contain batteries?)
- Launch Tox (Does your hardware contain Liquids, fumes, grease, powders, particles, creams, gels or other Toxic elements)

Still have questions?  
Tell us whats on your mind...

Send

Additional Questions

- ▶ Primary CMC POCs (IT, Cargo Integration, Stowage Integration and Logistics)
- ▶ eLRODS Tool is located at the following link
  - <https://mycmc-apps-ext.jsc.nasa.gov/elrods/index.html>



# Summary

- ▶ Accurate and timely receipt of eLRODS is critical to
  - Ensuring hardware safety is maintained from receipt at CMC to its arrival on the ISS
  - Meeting ISS delivery milestones



# Back Up

# eLRODS Questions

- CMC has 4 primary POCs to address, IT, Cargo Integration, Stowage Integration and logistics questions
- Contact information can be found under the “Questions” tab on the eLRODS home page
  - <https://mycmc-apps-ext.jsc.nasa.gov/elrods/poc.html>

## IT Tools/Issues accessing eLRODS

▶ Juan Moreno-Gongora  
281-280-4137 (office)  
218-224-9536 (cell)  
[juan.moreno-gongora@lmco.com](mailto:juan.moreno-gongora@lmco.com)

- Please provide your IP address and the time when you tried to access eLRODS

## Cargo Integration

- Kristie Brandon  
281-280-4130  
[kristie.l.brandon@lmco.com](mailto:kristie.l.brandon@lmco.com)
  - ESD
  - Launch Tox
  - Launch Packing/Assembly
  - Launch Ground Handling
  - Return Packing/Assembly
  - Return Ground Handling

# eLRODS Questions

## Stowage Integration

▶ Ken Moulder

281-280-4132

kenneth.moulder@lmco.com

- ESD
- Launch Characteristics (all questions)
- Launch Packing/Assembly (all questions)
- On-Orbit handling (Does the hardware require stowage provisions for on-orbit stowage?)
- Return Tox (Does your hardware contain Liquids, Fumes, Grease, Powders, Particles, Creams, Gels or other Toxic elements (except batteries)?)
- Return Characteristics
- Return Packing/Assembly (all questions)

# eLRODS Questions

## Logistics

Greg Eick

281-280-4110

gregory.f.eick@lmco.com

- Launch Tox (Does the hardware contain batteries?)
- Launch Tox (Does your hardware contain Liquids, fumes, grease, powders, particles, creams, gels or other Toxic elements (except batteries)?)
- Launch MSDS(s)
- Launch Characteristics (Is the hardware launching under pressure?)
- Launch Characteristics (Does the hardware contain permanent magnets?)
- Launch Ground Handling (all questions)
- Return Tox (Does the Return configuration contain batteries?)
- Return Tox (Does your hardware contain Liquids, Fumes, grease, powders, particles, creams, gels or other Toxic elements (except batteries)?)
- Return Ground Handling (all questions)